C&D ASSOCIATES, INC.
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MANDITORY SERVICE BULLETIN

MANDITORY COMPLIANCE REQUIRED

Bulletin MSB-0001 Issue Date 02/11/2011 Rev. –

SUBJECT:

This Mandatory Service Bulletin (MSB) is issued due to a high percentage of Piper Chieftain PA-31-350 heaters failing Pressure Decay Test (PDT) from ruptured combustion chambers. Inadequate heat distribution for the aircraft cabin and unstable fuel supply to the heater are contributing factors to the premature heater failure.

AIRWORTHINESS CONCERNS:

While there have been no accidents or incidents related to any of C&D Associate's combustion heaters, the serious danger presented by premature combustion chamber failure could place the aircraft and passengers in serious danger. Any breach of the air tight combustion chamber could provide a passage way into the cabin for fire or carbon monoxide.

PURPOSE:

This Mandatory Service Bulletin (MSB) is issued to require immediate inspection to identify C&D heaters installed in the Piper Chieftain Model PA-31-350 for further inspection by PDT and arrange for factory modification or replacement. The MSB is also to announce the availability of an FAA STC/PMA modification kit that incorporates design improvements for fuel supply and heated air distribution problems now existing in the aircraft heating system. Installation of the airframe modification will enhance heat distribution into the cabin by 30 % and stabilize fuel to the heater for longer combustion heater life.

BACKROUND:

C&D Associates Inc. (C&D) has identified problems involving the complete heating system exclusive to the Piper Chieftain Model PA-31-350. Unstable fuel supply to the heater, inadequate heated air distribution into the cabin, and the heater design are contributing factors to the premature heater failures.

Two C&D heaters exclusive to the Piper Chieftain were returned for failing a pressure decay test. The heater part number CD14048-1 is FAA/PMA approved as direct replacements for the Janitrol part number (FR)65D79(-1, -2, -3 EL). On inspection it was found that the combustion chambers had ruptured. Because of the unusual characteristic of the failure, inspection was made of the Chieftain heaters that had been in C&D's core bank having been exchanged for C&D heaters. Of the 25 Janitrol heaters examined for comparison of the premature failure, 13 had combustion tube ruptures. Heater combustion chamber failure prior to reaching 1,000 hours of operating time is very rare and normally caused by fuel nozzle contamination. Results of this inspection reviled that over 50% of the heaters installed in the Piper Chieftain Model PA-31-350 have failed pressure decay tests (PDT) due to burned off portions of the flame tube causing premature combustion tube ruptures.

Two low time examples are pictured here with the end dome removed. The pictures show burned out sections of the center flame tube. This flame tube deterioration then allows the concentrated

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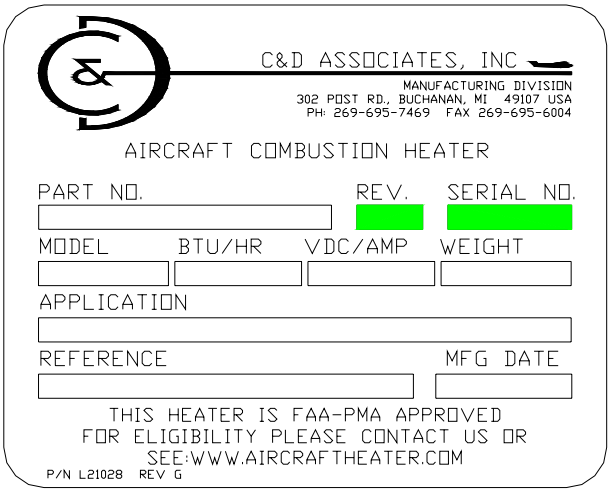
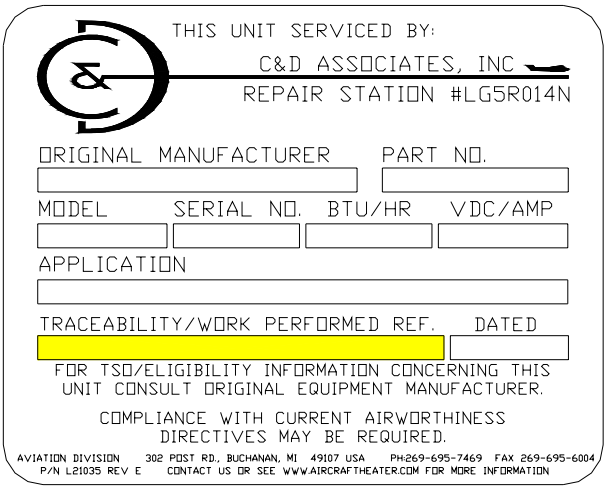
heat to weaken the sealed chamber wall causing the tube to rupture. The first is a C&D heater with 560 hours time in service. The second is a Janitrol factory remanufactured heater with 184 hours time in service.

C&D Heater **Janitrol Heater**

PRODUCT IDENTIFICATION:

Includes combustion heaters sold prior to the date of this service bulletin with part number CD14048 (-1). These heaters are FAA/PMA approved to replace the Janitrol part number (FR) 65D79 (-1, -2, -3, EL) exclusively installed in the Piper Chieftain model PA-31-350. Affected heaters can be identified by checking the heater data plate. Information after the part number (see green below left) provides the revision level that the heater was built to and then its serial number. C&D Associates Inc. manufactured heaters with data plates indicating revisions up through "Rev. D" and a serial number 1874 or lower requires compliance with this SB. Those C&D heaters affected and modified in compliance with this MSB will then have "MSB0001 C/W" clearly (see yellow below right) indicated on the heater data plate.





C&D heaters beginning with "Rev. E" and serial number 1875 and up or later revisions are built with modifications exempt from this MSB.

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ACTION:

Cause of the heaters premature failure has been identified to include design of the aircraft heat distribution and undependable fuel control to the heater. C&D has elected to recall all Piper Chieftain PA-31-350, heater part number CD14048 (-1) to be returned to the factory for inspection and modification. Modification of the heater will eliminate combustion chamber rupture when the aircraft heating system modification kit CD29151 is installed to improve air flow and stabilize fuel to the heater.

1. Prior to the next flight,
    a. Complete a pressure decay test (PDT) in accordance with C&D maintenance manual MM10001.
        i. In the event that the heater fails PDT, contact C&D prior to further operation.
        ii. Heaters that pass PDT will require a PDT test each 50 hours of operation until modification or replacement.
    b. Verify that installation instructions IN14048 Rev E dated 2/1/11 (attached) have been complied with. Give special attention to:
        i. Combustion air inlet modification (Step 2.A.)
        ii. Fuel pressure check (Step 3.C.)
        iii. Upper limit temperature setting (Step 3.C.2.)

2. Contact C&D with the heater serial number to ensure a timely and orderly modification or replacement.
    a. Heaters still under warranty will be given 1st priority. Modification will include overhaul to "0" time and cost will be in accordance with C&D pro-rated warranty terms.
    b. If the heater is no longer under warranty, modification and overhaul to "0" time will be consistent with current pricing.
3. Install the heating system modification kit part number CD29151 to ensure proper fuel pressure and provide 30% more heated air distribution into the cabin.

Pricing / warranty:

Special pricing has been established for heaters modified/replaced and the "Heating System Modification Kit CD29151" is purchased in compliance with this MSB until August 30, 2011.
New heater warranty of 4 years/1000 hours will be provided to heaters P/N CD14048-1 when returned for "0" time overhaul and the heating system modification kit CD29151 is also purchased for installation in the aircraft.

Labor:

Heater removal and reinstallation is estimated at 4 hours, or 6.5 hours when the aircraft modification kit CD29151 is also installed
Heating system modification kit CD29151 installation is estimated at 2.5 hours with the heater removed.

HEATER
P/N CD14048-1

Piper PA-31-350

READ COMPLETE INSTRUCTIONS BEFORE BEGINNING INSTALLATION
Accomplish all wiring in accordance with AC43.13-1B Chapter 11, Electrical Systems.
Accomplish all plumbing in accordance with AC43.13-1B Chapter 8, Section 2, par. 8-31.

1. Preparation:
   A. Follow the Aircraft Service Manual or other FAA approved source for removal of the existing Combustion Heater.
   B. Install the C&D Associates, Inc. TSO-C20 Approved Combustion Heater utilizing the existing Aircraft Service Manual or other FAA approved source where applicable.

2. Combustion Air Inlet Modification:
   A. For proper combustion air balance, combustion air inlet scoop (located forward of where heater exhaust pipe extends out of aircraft.) needs proper scarf (see fig. 1). This angle is 15 deg. with longer portion of scarf aft. Supplied inlet template (fig 2) can be cut out and taped around existing inlet, transfer angle with a marker. Trim and de-bur. Top of template may or may not reach to aircraft skin.

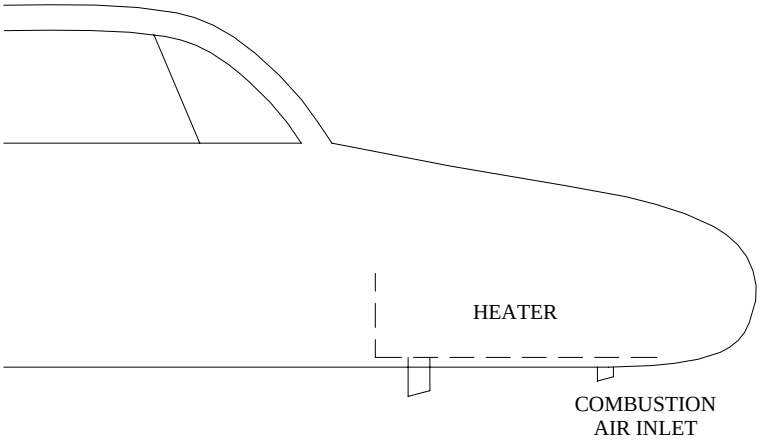
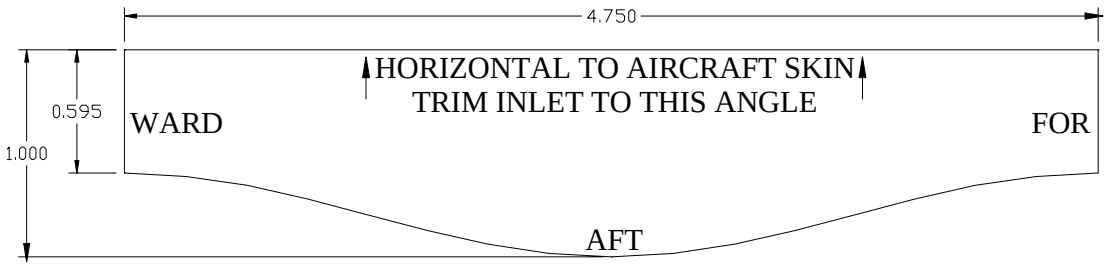


FIGURE 1



INLET TEMPLATE (15º Scarf)
FIGURE 2

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3. HEATER OPERATIONAL TEST AFTER INSTALLATION:
IMPORTANT!! Please complete the followings steps after the new heater is installed in the aircraft.

A. Install a temperature probe (min 0-500° F) in the outlet plenum 6-8" aft of the heater. A good location would be approx. 6" aft of the heater or near the thermostat sensor. Usually you can find a small access point somewhere in the ducting aft of the heater. Otherwise it may be necessary to drill a small 1/8" hole through the heat distribution plenum allowing a thermo couple to enter unobstructed, into the heated air stream approx. 1".
CAUTION: **Never drill into combustion heater itself! Verify nothing will be damaged in this process.**
CAUTION: **Verify thermal couple is not touching plenum internal wall.**

B. Place a 6" 20G jumper wire with 2 small alligator clips (or the like) across the heater terminal strip numbers 2 and 3, which will bypass the aircraft thermostat. (Fig. 4)

CAUTION: Be sure not to short any other terminals.

C. Install the fuel pressure gauge (0-15). Tee into as shown. (Fig. 3)
1) With the heater running, verify fuel pressure. Preferred pressure is 8psi. (6.5psi min, 10psi max)
2) With the heater running, verify that the outlet plenum temp. is approx. 250°. Adjust the cycling switch if needed. Clock-wise to increase, counter-clock-wise to decrease temperature. (Fig. 5)

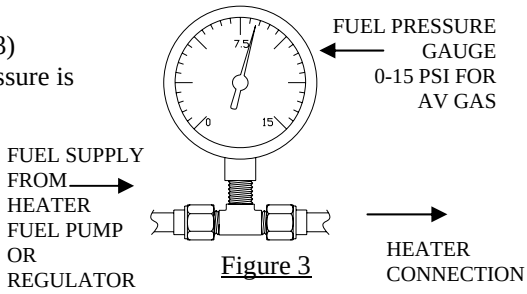


Figure 3

NOTE: Adjust screw no more than ¼ turn at a time.
3) Remove the jumper wire and verify that the temperature is controlled by the aircraft thermostat from low (approx. 75° F) to medium to high (approx. 250° F) which is what the cycling switch is set at.
4) Remove the temperature probe. If drilled, seal the 1/8" hole with high temperature silicone.
5) Remove the fuel gauge installed in step 3.C. Leave the "tee" fitting and cap off for future pressure readings if desired.

If the hoses need to be replaced, we recommend Sceet-6 (1 ½") red from the blower to the heater and Ceet-6 (1 ½") black from outside air to the blower.
For additional information see the "maintenance manual (MM10001)" included with this heater under "Testing after installation or overhaul."

Figure 4

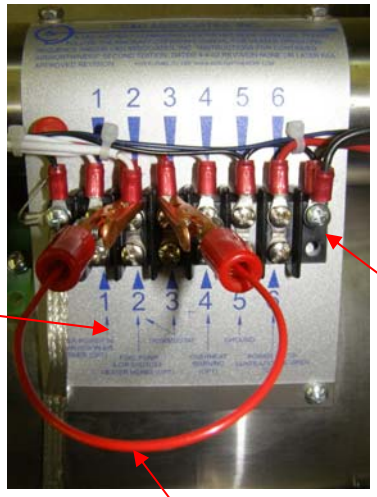
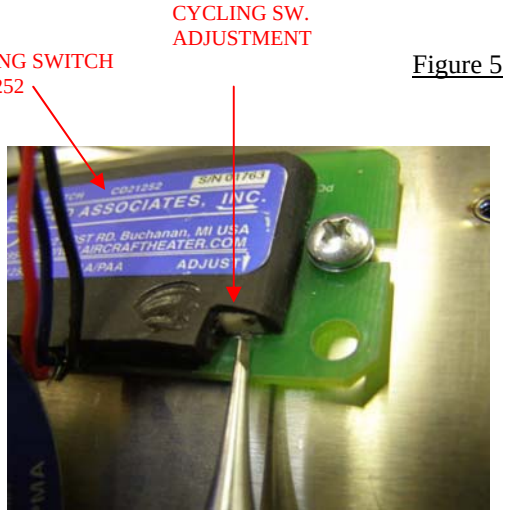
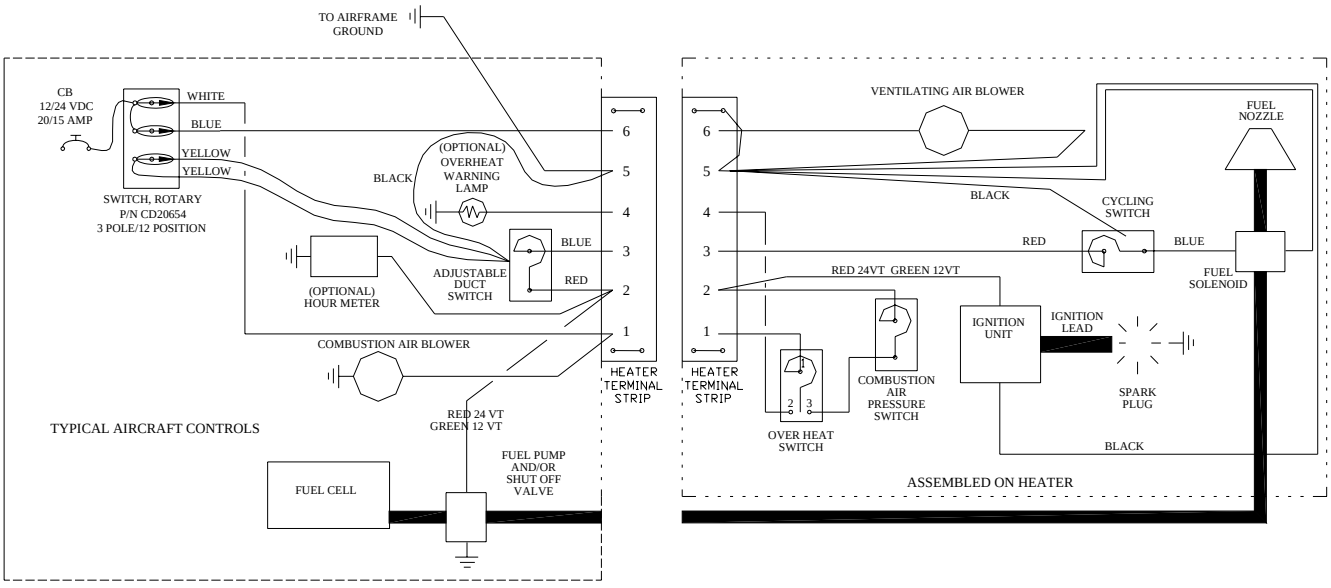


Figure 5



WIRING SCHEMATIC



AIRFRAME SIDE HEATER SIDE

4. After installation, complete the operation and heat output tests specified in the C&D Associates, Inc. MM10001 Maintenance Manual for aircraft combustion heaters dated 1/1/08. Tests should be accomplished in accordance with section IX 'C' operational test, and 'D' for heat output, steps 1 and 2. Also in accordance with the "Instructions for Continued Airworthiness" step #1 "Preflight/Operational check and Shutdown Procedure."

5. NOTE: Follow the 'Combustion Heater PREFLIGHT/OPERATIONAL CHECK AND SHUTDOWN PROCEDURE' outlined within the Combustion Heater "Instructions for Continued Airworthiness", Second Edition, Revision: none, dated 04-04-02, or later revision, included with these instructions. This FAA-approved Instructions for Continued Airworthiness must be complied with and become a permanent part of the Aircraft Operations and Procedures manual.

6. Verify all wires are secure and free of obstruction and chaffing.

7. NOTE: Janitrol AD96-20-07 Combustion Heater Airworthiness Directive does not apply to the C&D Associates, Inc. Combustion Heater.

8. NOTE: Removal of the Combustion Heater and the installation of the C&D Associates Products TSO-C20 approved heater will have no net effect on weight and balance or electrical load requirements.

9. NOTE: Insert the attached label, 21503, into the aircraft flight manual in the heater operating section. Correct equipment list to reflect new C&D Associates, Inc. heater and part number.

10. NOTE: Utilize existing aircraft combustion heater operating instructions or other FAA approved combustion heater operating instructions where applicable.

C&D ASSOCIATES, INC.

DOCUMENTATION AND PARTS REQUIREMENT TABLE

DOCUMENTATION		Quantity	
1. FAA/PMA Supplement #60		____	
2. Label for flight manual (21503)		____	
3. MM10001 Maintenance Manual		____	
4. Combustion Heater Airworthiness Limitations		____	
5. Quality Assurance Certificate of Compliance #527		____	
PARTS			**S/N**
1. (1) Heater	CD14048-1	____	_____
2. (1) Combustion Air Blower	21415	____	

Initials: _____ Date:_____

For warranty information see website www.aircraftheater.com

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